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MATTERS CANINE *

(i) LEPTOSPIROSIS IN THE DOG
(ii) VIRUS DISEASES IN THE DOG
(iii) DISEASES OF THE DOG'S TEETH
(iv) MODERN METHODS OF BONE FIXATION

BY

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I would like to say at the outset that I appreciate the honour of being asked to address your Association. I have selected a miscellany of subjects with no special relationship to each other and my main criteria in selection have been to deal with those of topical interest in which new knowledge has arisen; also those conditions, not necessarily spectacular in themselves, but in which we, as a profession, can make a real contribution in treatment by understanding the underlying causes and how they can be removed, and, lastly, those conditions in which the additional new knowledge I have mentioned, instead of answering our old problems has made confusion more confounded.

The survey is not by any means comprehensive, but is as much as, or probably more than, can be dealt with within the period at our disposal.

LEPTOSPIROSIS IN THE DOG

First, I would like to say a few words on leptospirosis in the dog.

Leptospira icterohaemorrhagiae.—I will dismiss this very briefly; not that it is not a serious disease, but because there is little new since Dalling and his co-workers in 1925 identified the " yellows " of dogs with Weil's disease in man. The disease is patchy in its distribution and has been associated with rat infestation in areas where, either directly or indirectly, rats are likely to get in close touch with our patients. We find that, in spite of the large percentage of rats in a city like Glasgow passing viable leptospira in their urine, the disease is much less common than, for instance, in the surrounding country. This is merely an epidemiological problem associated with a difference in the habits of dogs, not unlike the position of rats and human plague: town dogs rarely have an opportunity of meeting the rat, whereas country dogs do. In young puppies in my district the disease is frequently peracute and an outbreak may be manifested by sudden death in half the members of a litter, the remainder showing intussusception and rarely living sufficiently long to develop icteric symptoms. In the less acute cases in older dogs penicillin or streptomycin can be tried and is reasonably successful if given sufficiently early in not too severe cases. In areas where the disease is endemic I always advise vaccination of the puppies and have not yet met a breakdown.

L. canicola Infection.—In the case of *canicola* infection, much new work has come to light in the last ten years. R. Stuart and McIntyre, Broom and Joshua, and many others, have contributed very considerably to the solution of this problem. It is many years since the condition was first recognised on the Continent, but the frequent identity of what was described as " Stuttgart disease " with leptospirosis was not recognised in this country. For that matter, the frequency of the occurrence of nephritis in dogs went unnoticed in Britain and one has only to read the journals of the 'twenties to find how often this disease must have been diagnosed as chronic gastritis, chronic Stuttgart or, in certain cases, tuberculosis. The early stage of nephritis, what McIntyre calls " the primary renal stage," was often missed and the terminal phase associated with kidney failure, which is manifested by a haemorrhagic condition of the stomach and intestine, was often on macroscopic evidence considered to be a gastritis. The fact that vomiting associated terminally with blood or coffee-ground vomit almost invariably occurred in these circumstances supported this line of argument.

There were frequent references in the literature to Stuttgart disease applied to a syndrome now recognised as belonging to a certain stage of kidney failure associated with uraemia and characterised by necrotic lesions in the mouth or cheeks. McIntyre stresses that the uraemia can happen without the presence of these lesions. It is fairly generally accepted now that in many cases this syndrome is a manifestation of kidney failure with uraemia arising from any cause. Recent work by McIntyre has indicated that probably 90 per cent. of nephritis in dogs originates as a result of *L. canicola* infection. My own impression would have rated it even higher. Stuart, in 1941, in random sampling of blood from Glasgow dogs, found evidence of past leptospira infection by agglutination test in 90 per cent. of dogs that were showing nephritis and in over 40 per cent. of all dogs. One disease which shows this syndrome of necrosis in the mouth that may not be associated with nephritis is nicotinic acid deficiency produced experimentally. The deficiency does occur naturally in Scotland, but the symptoms are not entirely parallel to the experimental disease in so far as the mouth shows evidence of a diffuse, red, inflammatory condition. There may also be deficiency of other members of the B complex. At home it occurs mainly among shepherds' dogs fed on maize (red mouth) and it responds in a remarkable way to yeast administration. The sloughing in the tongue in nicotinic acid deficiency is very similar to the type of sloughing which one finds associated with leptospira infection in a small percentage of cases and in the latter there may be a conditioned deficiency. At one time, prior to the introduction of penicillin, I invariably treated such cases with nicotinic acid and in many cases appeared to have beneficial results. In such cases I still use it combined with penicillin. I think there are probably many diseases where the infection alters the animal's requirements for a particular metaboloid. I will

* Presented to the North of Ireland Division, N.V.M.A., in Belfast, March 30th, 1951.

refer later to vitamin D deficiency in relation to distemper in this context.

In my view what at one time was referred to as " Stuttgart disease " was probably acute *canicola* infection in most cases and possibly when the disease was first introduced into the country there may have been a much larger proportion of peracute cases—the virulence tending to abate as is usual in epidemics established for some time. I think it would be advisable to confine the use of the word " Stuttgart " not to a disease but to a syndrome which might crop up in several diseases not excluding the distemper complex group.

In the early stages it is often difficult to diagnose *canicola* infection with certainty and I would like to pass on to you the procedure which we normally adopt in the Glasgow Veterinary School. If a young dog is presented with slight fever, pulse fairly full and increased in frequency, thirst and occasionally some vomiting, with a brick red tongue and the absence of symptoms which might suggest a catarrh associated with virus diseases, a sample of urine is taken and if albumen is not present there is a fairly strong presumption that *canicola* is not likely to be responsible. If the sample from such a young dog does show albumen, then a microscopical examination with dark ground illumination is carried out and in something over 50 per cent. of primary cases the organism can be demonstrated. A general microscopical examination of the sediment is also made. If the organism is not demonstrated tentative treatment is instituted and a further urine sample taken in a day or two. In suspicious cases the agglutination test is carried out forthwith and checked a week later to attempt to discover evidence of a rising titre.

Virus Diseases in the Dog

In this group I am considering (i) distemper due to Laidlaw-Dunkin virus, (ii) hard pad or paradistemper disease due to H.P. virus, (iii) encephalitis associated with circling and probably due to virus, (iv) Rubarth's disease or the encephalitis associated with the virus of fox encephalitis, (v) lymphocytic chorionic meningitis virus which rarely gives rise to clinical disease but frequently has caused confusion by its association with distemper virus or because of its presence in experimental animals being used for virus research. There are no doubt other viruses which further work will reveal. In 1949, at the Southport conference, there was a feeling of optimism in the profession that the position with regard to differential diagnosis in these virus diseases had almost reached a stage of practical application. Montgomery, McIntyre and Trevan produced an excellent paper correlating clinical disease with animal inoculation experiments and histopathological findings and on that basis instituted a new classification of these diseases. At that time the frequent occurrence of fox encephalitis, or infectious canine hepatitis, was not appreciated. They did, however, raise the question of its occurrence in this country. Prior to their paper, many people had accepted the fact that distemper was a disease caused by one virus and that different clinical manifestations arose from the presence of different clinical infections. Laidlaw-Dunkin's work in the 'twenties had supported the suggestion that distemper was one disease, but Pugh and Perdreau, in the early 'thirties, described a demyelinating condition in dogs associated with a virus and a brown mouth clinical syndrome. The widespread use of Laidlaw-Dunkin's prophylactic probably controlled the number of cases of true distemper, but there was still a large number of dogs that remained unprotected after vaccination and which were susceptible to distemper-like disease. In the paper at Southport, McIntyre *et al.* reported extensively on demyelination occurring in hard pad disease, although the presence of hard pads might occur in only about 40 per cent. of the dogs in an outbreak. There were other differences, including the reaction of experimental animals to this virus, but probably most important was their failure to convey the disease to dogs and also the invariable presence of demyelination on *post-mortem* examination. In the early 'forties the outbreak in Glasgow district at first was accompanied by a mortality of about 100 per cent., and in about nine months only a few cases had survived and most of these were mentally deficient afterwards or infantile. At the present day the mortality is still considerable—probably at least 50 per cent. At Southport I expressed the view that dogs which had been immunised by L.D. virus had a much better chance of recovering than those unprotected, but since then I have come across so many anomalies that I am less sure. The two diseases seem to be antigenically related and I would say that any dog which has acquired a natural attack of " distemper " is immune to hard pad disease. I rather suspect that only rarely have we had outbreaks of L.D. distemper in the last ten years in my part of the country.

My own major interest in the disease has been an endeavour to evolve some suitable method of differential diagnosis to allow of early treatment with specific serum or suitable antibiotic. My experience with hard pad disease has been that cases respond well if given large doses of serum, but the expense involved is such that one is justified in using it only if a definite diagnosis can be established. The cost in the case of a labrador might be anything up to £8.

The recent American report suggests that Rubarth's disease responds well to small doses (even 10 c.c.) of fox encephalitis serum. In attempting to establish an early diagnosis animal inoculations are expensive and not entirely suitable, and, in any case, many anomalies (because of the presence of other viruses) are apt to crop up. On the credit side, I think there is evidence that the position may be showing signs of clarifying with regard to differential diagnosis. We have used liver biopsy when Rubarth's disease is suspected, and I think we should manage to evolve a liver biopsy method suitable for everyday practice. Green, of Minnesota, also evolved an intra-ocular test for this disease which proved satisfactory in his hands but would be limited in its application in practice.

Mansey has been working at Weybridge on complement fixation as a means of differential diagnosis and, broadly, he has two main types of reaction. L.D. and hard pad appeared to develop the same complement fixation bodies and L.C.M. developed quite a separate group. Fox encephalitis also develops a third group of quite different complement fixation bodies. Mansey has recently isolated a virus from material supplied from the Glasgow School which shows a neurotropic and viscerotropic form, the former quite atypical when injected into ferrets, giving rise to nervous signs. Both these strains (Glasgow 123) show the same capacity for developing complement fixation bodies as L.D. hard pad. In our school, Mr. Michna is trying to work out how early the development of complement fixation bodies takes place and blood samples are removed at intervals to ascertain if this approach has a practical application in diagnosis. Personally I feel that a satisfactory method of early diagnosis is a prerequisite to successful treatment. If one could be sure that a particular

outbreak was due to, say, hard pad virus, specific treatment could be instituted early in the disease. Diagnosis with the circling type of disease is made easy clinically, although there are many pitfalls. It is occasionally associated with hard pad disease; practically all my cases, if well established, have died. I refer to the type of case with no history of a catarrhal illness but the gradual onset of nervous symptoms associated with inco-ordination and poor orientation. The animal does not tend to be savage, but may bite if interfered with. It will walk in circles or forward, but it appears to be quite incapable of reversing. Some such cases appear to be unable to lie down and, if laid in a recumbent position, may sleep for a long period.

I cannot be more definite about this group of diseases, but new evidence is becoming available which should permit of a more thorough classification. On the other hand, recent work suggests that clinical signs are no reliable guide and histopathology may not be useful even in *post-mortem* differentiation. Much of the recent evidence, especially that from the United States and Australia, would appear to indicate that any type of nervous symptom might arise in any virus disease and that differential diagnosis at the moment is an extremely difficult matter. Parry has described an outbreak in his dogs, which had been bred in virus-free surroundings at Newmarket, which showed nervous symptoms that might have been due to any virus disease but which he attributed to fox encephalitis (Rubarth's) virus.

Diseases of the Dog's Teeth

I would like to include a few remarks on this subject, not because new information has become available but because it is a subject neglected by some veterinary surgeons and I consider that a thorough knowledge of the diseases of teeth is an essential prerequisite to satisfactory treatment. There is no treatment which gives rise, so rapidly, to improvement in our patients as dental treatment administered in any of the well-defined and easily recognised conditions. I believe the most comprehensive article on this subject was that in *The Veterinary Record*, **51**, page 409 (1.4.39)—"Some Observations on Dental Disease of the Dog," by John George Wright. While agreeing with most of what is said in this article, I recognise another important condition which he does not describe as a separate entity, *i.e.*, alveolar periostitis.

The most important diseases of dogs' teeth are pyorrhoea, pulpitis associated with caries and dental fistula, dentine hypoplasia, alveolar periostitis and rubber jaw.

Pyorrhoea.—This is probably the commonest. Mellanby's work suggests that lack of vitamin A during puppyhood may be a predisposing cause. Henry Gray pointed out early in the century that even small pet dogs kept on rough natural food, including bones, meat and gristle, will not develop this condition. It is a fact, however, that a dog that has been kept on a good growing diet as a puppy of sloppy food with nothing hard (*e.g.*, the typical farm dog), receiving milk and porridge and probably potatoes and porridge, frequently will develop a perfect mouth when his diet in adult life includes no satisfactory roughage. It may be there is a common factor in both these cases, *i.e.*, that the diet during the development of the teeth contains an adequate amount of vitamin A. Mellanby's work certainly indicates that lack of this vitamin leaves an open sulcus at the junction of the teeth and the gums which predisposes to infection. The same worker also claimed that, provided adequate vitamin A is given in the first four months of life, large doses are not required in adult life to maintain healthy gums and, conversely, large doses of vitamin A after the teeth have erupted will not correct the condition of pyorrhoea if once developed and will act only as a palliative. The condition is manifested by redness on the gum margin, foetid breath, exudation of sticky discharge at the gum margins with subsequent encrustation with tartar; as the condition develops there is inevitably loosening of the teeth depending on the degree of involvement. An extracted tooth, from the point of the root to the alveolar margin, has the appearance of a pink, fine pile velvet and shows an abrupt change at the line of demarcation to a white, smooth or eroded bone surface. The only cure, of course, is radical removal of all loose teeth and the prescription of oral hygiene, mechanical cleansing of the gums with simple antiseptics daily and an instruction to the owner to continue to have the teeth attended to at yearly or twice-yearly intervals, until all the teeth have been removed. If this is done health can be maintained over a long period, the dog thriving on the type of diet which originally precipitated his disease. If the teeth are left over a period of years there is some impairment of health and it is no exaggeration to say that most old dogs that have suffered from this condition have survived because there is a tendency for spontaneous loss of the teeth with recovery, and that with cases that receive no attention but do not lose the teeth the span of life is curtailed, due to toxaemia or intercurrent disease.

Pulpitis Associated with Caries and Dental Fistula.—In some cases the cause of this trouble is a fracture of the outer wall of the teeth which lays open the pulp cavity. In some the fractured piece of tooth may still be attached to the gum margin on which it hinges, but in many cases the sequestrum has been lost prior to the veterinary surgeon being consulted. This fracture lays open the pulp cavity very often through a fine crack and allows of the entrance of pyogenic bacteria with the subsequent development of pulpitis. In other cases there may be no obvious route of infection to the pulp cavity. The point I wish to make is that the caries appears to be always secondary to the pulpitis in dogs and the process is quite different from caries in man. Mitchell, of Edinburgh, was the first person to draw my attention to this. The infection appears to progress to the apex of the roof and descends along the periostial alveolar junction; it also causes necrosis in the overlying malar bone. Subsequent symptoms depend on the speed of these two processes. If the latter is more extensive, then a dental fistula will be formed; if the former, there may be no external manifestation and pus is discharged into the mouth. This diseased condition causes definite toothache in dogs, the only other disease giving rise to true toothache being alveolar periostitis. The dog can be seen carefully chewing on one side and hot drinks and ice-cream give rise to pain. As the condition progresses, the whole tooth becomes carious, the disease spreading from the central cavity; an advanced case in the fourth pre-molar in the upper jaw shows three areas of tooth persisting, the three outer corners attached to their respective roots. Complete extraction of all the roots is absolutely necessary to achieve resolution: if, perchance, the smallest piece of root is left and drainage is interfered with, recurrence of the fistula is certain. Occasionally the fistula persists for some time if an extensive area of bone has been damaged, but normally even in long standing cases it clears up in one week. From the point of view of practice, a veterinary surgeon is usually consulted because of a wound below the eye. The owner generally can think of some comparatively recent fight in which the dog has been involved and attributes the wound to the fight, even when he cannot recollect any bite in this

region. All such wounds, in spite of the most dogmatic history of injury, should be examined for possible dental fistulae. I consider that in practically every case dental fistula in dogs is the result of disease of the tooth in the first place, although I believe that in cats the condition may arise from external injury. I know this view is not universally held, but my own experience tends to support it. Examination of the inside of the mouth may reveal a white or grey area on the central cusp of the tooth. The tooth may be very firm and there is probably no evidence of inflammatory condition. The lesion is often bilateral and usually affects the fourth pre-molar on the upper jaw, sometimes the first molar and sometimes the first molar in the lower jaw. It may be necessary to remove the external plate of bone to extract the tooth or to cut the tooth or divide it.

Dentine Hypoplasia.—This condition frequently has been referred to as " distemper mouth " or " canker mouth." It is characterised by improper ossification of the mandible and maxilla and by the deposition of imperfect or faulty enamel. The teeth may appear to be quite normal when first erupted but in a very short time there is erosion of certain areas of the enamel revealing the characteristic pitting and staining associated wth this condition. Mellanby proved that this disease could be caused in young puppies by withholding vitamin D from the diet or by including in the food a rachitogenic substance, such as phytic acid. In practice, most cases occur in dogs as the result of a virus infection between the ages of six weeks and four months; in fact, if the illness is of short duration, the area of the tooth affected indicates the time of the illness, *e.g.*, at eight weeks only the apex of the tooth becomes affected, at four months only the gingival border. In most cases, however, the illness is of long duration and the whole of the tooth may be affected; indeed, some teeth may not erupt at all. The distemper virus appears to have a rachitogenic effect. When Laidlaw and Dunkin first evolved the prophylaxis against distemper, I started immunising at six weeks, but in every case I caused marking of the puppy's permanent teeth. At one time I considered that in cases of distemper the virus acted by the associated diarrhoea preventing the absorption of vitamin D from the bowel, but in view of the above evidence I think it is more likely that the virus is specifically rachitogenic, causing a larger demand for the metabolite. One surprising feature in this condition is that a dog with faulty enamel fails to develop caries and is in fact not particularly prone to pyorrhoea in later life. It does, however, almost invariably show gingivitis with a slightly heavy smell from its breath. I remember one case where a dentist had painstakingly drilled out these holes and when the dog smiled it showed an opulent flash of gold.

Alveolar Periostitis.—This condition is much more rare. There may be no obvious gum lesion and in many cases the teeth may appear to be white, sometimes remarkably so. There is some inflammation in the gums, but the mucous membrane is not usually ulcerated. There is a sickly foetid odour and if there is any discharge, it is of a sticky, tenacious nature. A dog may show evidence of pain and rub the side of the mouth from time to time. In time the gums recede from the margins of the teeth, exposing part of the roots which tend to be white. The inflammatory reaction at the alveolus is mainly osteoclastic, but at the apex of the tooth is largely osteoblastic, rendering extraction extremely difficult. In many cases the external plate of bone must be removed prior to extraction. The condition responds to removal of the affected teeth but is progressive and in most cases affects all the teeth so that a complete cure is not achieved until all the teeth have been removed. There is a limit to what can be done at one time in this disease and a series of operations is carried out over a period of years. There is probably no single disease that is so difficult to deal with but complete success can be achieved when all the teeth have been removed. If even one or two small roots are left, however, there will be a recurrence of symptoms which will persist until these have been completely extracted. After months, the gums become hard, the dog ceases to have pain and certain cases will even attempt to crack bone with the gums.

Rubber Jaw.—This disease is still one of the mysteries in veterinary practice. The condition may be associated with abnormalities in the parathyroid gland. In practice, I have never had any success in treating such cases. I only mention it here because I consider it particularly important to recognise in the early stages—otherwise one can do serious harm in attempting to remove diseased teeth, causing fracture of the jaw or avulsion of considerable areas. One interesting feature is the associated nephritis which in my cases has invariably been present. I have known a case last as long as a year, but I cannot claim that my treatment was beneficial in even prolonging the course of the disease.

(At this point the speaker elaborated the dire consequence of extracting teeth in a nephritis showing mouth lesions and in bone tumours.)

Modern Methods of Bone Fixation

Fortunately for the veterinary profession, there has been very considerable advance in most aspects of activity in the last 30 years, and bone surgery is no exception to this general rule. Orthopaedics in human surgery has been recognised as a scientific subject only since the beginning of this century. Wm. Jones (a nephew of Thomas of the splint fame) was one of the first people to achieve for orthopaedics the recognition it deserved. In veterinary practice in the early 'twenties, external splinting was the only method in use and plaster bandages wound round the reduced fracture successfully achieved immobilisation in most cases. There were, however, always certain types of fracture that refused to yield to this type of treatment and in some of these Thomas's splint was useful. In high fractures in dogs this type of treatment was often completely unsuccessful and, in the early 'thirties, I started open reduction, using silver wire drilled through the bone to keep the ends of the bone in apposition. I remember my first case—a dog with a fractured femur of three months' standing, with the ends widely displaced and the whole leg moving like a

Case A. No. 1.—Small Cross Fox Terrier. Pinned K.E. Open reduction. (Lower pin unit inserted in distal fragment.) October 19th, 1950.

Case A. No. 2.—Healed. K.E. Immediately after removal. (Walked on leg on seventh day.) November 11th, 1950.

Case B. No. 1.—Cat. Fractured distal end femur. Typical backward displacement of lower epiphysis. February 14th, 1950.

Case B No. 2.—Pinned—open reduction.

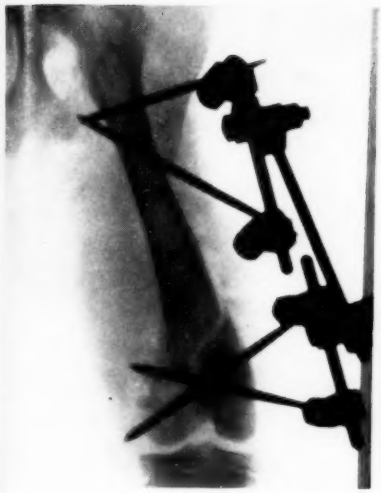
Case B. No. 3.—Fracture healed—full use made of leg.

Case C. No. 1.—Alsatian. Old-standing angled fracture—radius and ulna. Before operation (seven-month-old dog). May 14th, 1950.

Case C. No. 2.—Triangular section (wedge) removed from level of the epiphyseal line and Sherman type Vitallium plate *in situ.* July 1st, 1950.

Case C. No. 3.—Fracture healed October 7th, 1950. Carpal movement 50 per cent. normal. Dog walked well and ran sound.

Case D. No. 1.—Five-year-old Cross Fox Terrier. Three-month-old fracture of olecranon. Drawn upwards by the triceps muscle. January 14th, 1950.



Case A. No. 1.

Case A. No. 2.

Case B. No. 1.

Case B. No. 2.

Case B. No. 3.

Case C. No. 1.

Case C. No. 2

Case C. No. 3.

Case D. No. 1.

CASE D. No. 2.
Pinned. This animal took a long time to use leg (eight weeks). Sound in 12 weeks.

CASE D. No. 3.
Pin removed ten months later. Elbow function 100 per cent. (Pin was left in this length of time because of evidence of very slow healing on X-ray.)

E. F. LEWIS and H. H. HOLMAN: Haemophilia in a St. Bernard Dog (Page 666)

FIGURE. Radiographs of left and right (R) stifle joints, showing vague shadow of blood clot and forward displacement of patella in right joint.

flail. After operation the dog was almost sound in six weeks and completely so in three months. The wire merely held the bones together but did not immobilise the leg. Immobilisation was achieved by the super-imposition of an aluminium splint cut to the shape of the limb. The silver wire was very apt to break and, on searching for a better medium, I was introduced by James Stevenson, of the Royal Infirmary, Glasgow, to a continental preparation called Vienna silk made of phosphorbronze alloy—fine strands plaited together which gave a ligature capable of being tied in knots without breaking.

Meantime, the Stader splint was being developed in America and the new methods of bone-pinning were being carried out in the United States and on the Continent. In this country, use of plates and grafts had been experimented with for many years with variable results. Gordon Knight was the pioneer in this aspect of veterinary surgery in this country and he perfected several techniques in bone-pinning, particularly for fractures of the femur, humerus, but also of the radius and the tibia. I would like to review briefly several types of fractures that, in the old days, almost invariably gave rise to deformity or permanent lameness, and that, by the application of new methods, can now be expected to heal satisfactorily in most cases.

(i) Fracture of the distal end of the femur will often give rise to permanent lameness even with the use of Thomas's splint, but intramedullary bone-pinning is ideal for this fracture provided the distal fragment is not too small or is not split longitudinally. Lawson, of Glasgow, has used either external bone-pinning apparatus like a miniature Kirschner-Ehmer splint and in this site departs from the usual practice of the fixation of the nearby joint, his lower assembly being fixed in the distal part of the femur. In suitable cases he has used an intermedullary pin, occasionally with a screw tip. (See plates A and B.)

(ii) Fracture of the humerus frequently will respond completely to pinning. In fracture of the head of the ulna, Lawson, in a small number of cases, has had good results by means of bone-pinning or plating. The latter entails some considerable difficulty. (See plate D.)

(iii) Fractures of the epicondyles of the humerus are best treated by bone-screwing or bone bolt as carried out by Spreull, of Dundee. He actually transfixes the epicondyles with a screw or a bolt.

(iv) Fracture of the mandible: (*a*) at the symphysis—these are best carried out in the same way, or by wiring through. (*b*) Fracture of the mandible at the transverse ramus by bone-pinning and (*c*) fracture of the angle by Kirschner-Ehmer splint.

(v) Fracture of the os calcis. Bateman has described a technique for this by fixing an external metal bar through the distal end of the tibia to the os calcis, thus immobilising and fixing. I think Mr. Thomson, of Glasgow, has improved on this by using the same type of fixation but increasing the rigidity by inserting an extra pin lower down and forming a complete metal triangle.

(vi) Fracture of the accessory carpal bone. Bateman has advocated cutting the tendon of the digital quintus muscle to prevent the pull of the muscle and allow of healing.

(vii) Severe fractures of the radius—lower end—have been dealt with by Gordon Knight by means of Sherman plates. We have also good results at the Glasgow School with this method. (See plate C.)

(viii) Multiple fractures of the pelvic girdle involving the femur and the pelvis are dealt with by a method of bridging (with Kirschner-Ehmer units which bridge the pelvis) as described by Knowles, of Miami, at the London Congress two years ago.

(ix) Fixation of the dislocated femur has always proved a difficult problem, if accompanied by a rupture of the teres ligament. I have used a technique described in the Journal of the A.V.M.A. which depends on bruising of the adjacent muscles with the resultant swelling to keep the head of the femur in position. The patient is anaesthetised and the muscle hammered while the dog lies on a rubber support.

Dr. Jacques Jenny, of Berne, who is working at the Clinic in Philadelphia, has used a unit of the Kirschner-Ehmer splint which incorporates a ball and socket joint, allowing the limb in such cases to move on its long axis, but not from side to side.

Discussion

Mr. Alex. McLean, City Veterinarian, Belfast, opened the discussion. He expressed his interest in Mr. Weipers' paper and regretted he had not had an opportunity of seeing the paper previously.

In his experience, caries was a rare condition and, on the few occasions on which he had seen it, it had been present in the first and second molars in the upper jaw. He could not agree with Mr. Weipers on the origin of dental fistula. He considered that many cases were due to external injury, as the malar bone was relatively unprotected, and that in many cases the injury could arise from the dog passing through a partially open door. Nor could he agree that the injury started from the tooth proper as in these circumstances it would, in his opinion, be easier to remove the tooth than is usual. He considered it extremely important that an anaesthetic should be given in every dental treatment, even in removing temporary incisors, otherwise the veterinary surgeon was looked on with disfavour and disapproval by the patient whenever he returned to the house. Mr. McLean stressed the importance of experience and skill in the extraction of teeth and the necessity for pressing well into the alveolus and, in the case of molars, breaking the external wall with the forceps and rocking the tooth prior to the extraction. In the case of incisors rocking was not necessary and if one pressed the forceps sufficiently far in the tooth was virtually squeezed out.

Mr. McLean expressed great interest in the X-ray plates shown by Mr. Weipers and considered that the work being carried out by Mr. Donald Lawson was of a very high order indeed.

With regard to the reference that had been made to using slabs of plaster of Paris rather than the old encircling method, he wished to stress the importance of applying the plaster directly to the skin without an intervening layer of cotton-wool. In very hairy dogs it might be necessary to clip some of the hair. In bone-pinning he almost invariably resorted to the open method as he considered it much more satisfactory. He described a technique he used in fracture of the os calcis whereby the tendon was cut and the leg fixed in plaster in flexion. He had not carried this out in greyhounds but his results had been satisfactory in cases that did not require to stand up to the stress of racing. His experience with plates had not been entirely satisfactory as he found these tended to work loose. Prior to using intermedullary pins of stainless steel he had used a peg made from the metatarsus of a greyhound, sharpened at both ends and boiled for an hour; this had been satisfactory. He considered one of the most important aspects of bone-pinning was that the medullary cavity should be almost completely filled. He usually left pins in for one month and considered that in many cases this line of treatment was an enormous improvement on anything that had been done previously. In many of these cases the dog was walking within 24 hours.

Leptospirosis

Mr. McLean proposed discussing leptospirosis purely from the clinical angle. In practice he had frequently seen cases where dogs of six, seven or eight years old after being in livery kennels for ten days or a fortnight showed typical symptoms of what at that time was referred to as "Stuttgart's Disease" but what he now recognised as *Leptospira canicola* infection. These dogs showed thirst, sickness and the onset of mouth symptoms characterised in many cases by necrosis of the tongue and ulcers inside the cheek, particularly opposite the fourth tooth. Urine examination of these revealed the presence of albumen but he had also found bile salts present in practically every case. More often in practice, one found cases of subacute canicola infection showing the usual symptoms that one attributed to this disease. Occasionally he found the quite atypical

case in young dogs showing few definite symptoms, slight fever, thirst, dullness, wasting and the absence of catarrhal symptoms ; in these cases he administered penicillin daily for a few days and if the case were indeed a leptospirosis the improvement was quite remarkable. In many such cases the left kidney was enlarged and palpable.

In discussing hard pad disease, he considered that he had seen evidence of hard pads in dogs 20 years previously (this was the usual type of disease now found in the North of Ireland) and that the old-fashioned Laidlaw Dunkin distemper was never encountered nowadays. He also considered that distemper inoculation protected dogs very considerably against hard pad virus. He had often found cases of circling disease in dogs five years old and more, but there was no evidence as to the nature of the causal organism.

In reply, Mr. WEIPERS agreed to disagree with Mr. McLean as to the origin of dental fistula in dogs. He personally considered that in every case it was associated with a primary lesion in the tooth and he considered that the reason for the difficulty in removal was that the area which was separate from the alveolus was actually at the apex and therefore would be of little help in removing the tooth, unlike what obtained in the case of pyorrhoea where the tooth was loosened in the alveolus from the gum margin until, in extreme cases, the entire tooth was loose right up to the apex. He agreed with Mr. McLean on the necessity for anaesthesia and also on the importance of veterinarians acquiring skill in tooth removal. He considered that the most important factor was probably the selection of really satisfactory forceps ; these were not made for veterinary use and had to be selected from the range available in human forceps.

With regard to Mr. McLean's remarks on the X-ray plates, Mr. Weipers agreed that the seven fractures that had been shown on the plates would never have healed by the older orthodox methods of treatment. He was interested in Mr. McLean's method of dealing with the fracture of the os calcis but would probably not have had the courage to attempt such heroic treatment. Mr. Weipers considered that Mr. Thomson's modification of Bateman's method was a distinct improvement. He considered that plates were of distinct value in fractures in the lower end of the radius.

With regard to Mr. McLean's description of leptospirosis in old dogs in kennels, Mr. Weipers agreed that this type of case was associated with canicola infection but that such cases were probably of long standing and perhaps not infectious, belonging to what McIntyre described as the secondary renal stage. Dogs that had recovered from an acute attack of leptospirosis frequently had impaired renal excretion which in normal circumstances was adequate to cope with minor emergencies but which might break down when a dog was completely removed from his usual environment and placed in kennels. Mr. Weipers said that those who had boarded dogs all recognised this type of case which, on admission, might appear to be perfectly normal and well. If one had had an opportunity of following a case known to have been affected with leptospirosis it was often possible to demonstrate albumen in the urine several years later in what appeared to be a perfectly normal dog. Such factors as excitement, excessive barking associated with abnormal loss of fluids and perhaps less opportunity for replenishing these than was available at home, and possibly an increase in the nitrogenous part of the diet, might contribute to the onset of kidney failure with in some cases the characteristic " Stuttgart syndrome."

Mr. MONIE wished to know if there was any breed incidence in Weil's disease. He had some experience of a kennel of Great Danes and Cairn Terriers wherein only the former were affected although both dogs used the same exercise runs. Did Mr. Weipers consider oliguria a usual feature in early canicola infection and did he consider that the onset of polyuria was an indication that recovery was taking place ? As a method of rapid diagnosis in Rubarth's disease did Mr. Weipers consider that Hanger's cholesterol test would be of value ? This definitely gave results in eight to 12 hours. He presumed that Mr. Weipers' reference to L.C.M. did not indicate that his virus *per se* gave rise to serious disease in dogs. With regard to rubber jaw, Mr. Monie had usually found an associated kidney disease.

In the case of fracture of the proximal third of the femur, did Mr. Weipers consider there would be an advantage in flexing the leg and approaching from the intracondyloid fossa in the stifle joint? He had evolved a technique for a fracture of the os calcis which he had found satisfactory in practice. He transfixed the upper part of the os calcis with a pin from side to side, bent the ends down where they emerged from the bone for ½ inch and then bent those at right angles in a lateral direction allowing them to project for another ¾ inch from the medial and lateral surface of the hock. He then encased the limb in plaster and the projecting pin held the os calcis in position and in those cases in which it had been used, allowed of satisfactory union.

In reply, Mr. WEIPERS said he had not noticed any evidence of breed incidence and the literature indicated that all dogs were highly susceptible to icterohaemorrhagic infection if exposed directly to the causal organism. He therefore considered that the reason for the apparent selective action in the Great Dane puppies was probably because they had had more close contact with possible infection. His own experience in kennels where this was endemic indicated that the puppies probably sought out places which had been contaminated by rats and infection was by ingestion. It was well known that Great Dane puppies tended to suffer from deficiencies, particularly associated with calcium and phosphorus, and as a result showed depraved appetite ; as a tentative explanation he suggested that these might have been more assiduous in seeking out places contaminated by rats' urine. He agreed with Mr. Monie that in some cases oliguria was present in the early stages but he did not consider that the onset of polyuria indicated recovery. It was merely a further stage in the disease process. He presumed that the cholesterol test to which Mr. Monie referred was a functional test and, while indicating liver disfunction would not specifically tie it to the fox encephalitis virus as would the demonstration of intranuclear inclusions in a sample of liver removed for biopsy. He agreed with Mr. Monie that the position of L.C.M. was very ill-defined in relation to clinical disease in dogs but this virus had been found associated with L.D. distemper virus and could give rise to quite confusing results in experimental animals. He agreed with Mr. Monie that every case of rubber jaw was associated with nephritis.

With regard to the fracture in the proximal third of the femur, Mr. Weipers considered that with open reduction it was probably better to insert the pin at the fracture site upwards and then push back into the final position in the distal part of the femur. This required the use of a double-pointed pin. He was very interested in Mr. Monie's method of fixation in fracture of the os calcis but considered that the method as suggested in the paper would probably be easier to apply.

Mr. GILMORE had had considerable use of the Stader splint but was not satisfied that it was the complete answer to most fractures. He asked Mr. Weipers about luxation of the scaphoid in racing greyhounds as this was probably one of the most common conditions met with in practice. He too, like Mr. McLean, had cut the tendon achilles in several cases of fracture of the os calcis in greyhounds and had had completely satisfactory results.

He agreed with Mr. Weipers that dental fistula was in most cases associated with primary disease in the tooth.

Mr. WEIPERS, replying, said that he had not had much personal experience of the use of the Stader and that they had only recently acquired in the school a Kirschner splint but he considered that it should be of infinite value. He pointed out that since the modern methods of bone pinning had come into use he had not seen a single case of displacement of the scaphoid. The clinical material for the college came from a Poor Persons Clinic and naturally racing greyhounds were not treated there. In the past he had usually dealt with this condition by reduction and the application of plaster or poroplastic felt.

Mr. MCLEAN interpolated here that he had had very good results in such cases by reduction and fixing and inserting a suture of chromic gut above the scaphoid in the interosseous ligaments, drawing it over the anterior aspect of the bone and again passing the suture through the lower row of interosseous ligaments. This had been satisfactory in keeping the scaphoid in position.

Mr. R. MOORE wished to know if, as there appeared to be a conditioned vitamin "D" deficiency in distemper, there would be any value in giving some of the new concentrates of vitamin "D" intramuscularly as a therapeutic. He also recollected that many years ago he had kept ferrets and from time to time they suffered from an infectious disease described by the keepers as " foot rot " and characterised by hard pads and keratinisation of the nose. Mr. WEIPERS said he thought it would be an advantage to give vitamin " D " in distemper provided it were given parenterally, in the same way as nicotinic acid had proved to be of value in certain cases of canicola infection showing deficiency.

He had no experience of ferrets but had heard this condition of foot rot described. It might be that hard pad had been present longer than was generally accepted. He certainly knew that Dr. Montgomery had suggested that hard pad infection was much more common in the ferret population than formerly.

Mr. MCLEAN suggested that the condition might be the sarcoptic mange which tended to affect ferrets on these two main sites and responded readily to acaride dressings.

WEEKLY WISDOM

Experience of various proposals confirms our belief that nothing is to be gained by associating Governments with the task of safeguarding the liberty of the Press. We must look to our own strength to meet the challenge from whatever quarter it may come.—Mr. NORMAN ROBSON (Presidential Address to the Institute of Journalists).

THE IMPORTANCE OF COLOSTRUM TO THE NEWBORN CALF

DISCUSSION BY THE ROYAL COUNTIES DIVISION, N.V.M.A.*

Dr. S. K. KON began by explaining the origin of the work on calf diseases at the National Institute for Research in Dairying, Shinfield. The experiments were started in 1945 under the aegis of the Agricultural Research Council to study the nutritional significance of colostrum in relation to "white scours." There was, at the time, a divergence between the experimental results of certain American workers[12, 13, 14] which stressed the importance to the newborn calf of the vitamins of colostrum, and those of Theobald Smith[16, 17] and his co-workers in the 1920s which emphasised the immunological significance of colostrum in relation to its high globulin content.

Before introducing the other speakers, Dr. Kon spoke of the close and friendly collaboration between workers at the N.I.R.D., and Dr. Lovell and his co-workers at the Royal Veterinary College, a factor that had contributed largely to the satisfactory progress of the work.

Mr. J. H. B. ROY then gave a brief summary of the present information about "white scours." Calf mortality due to white scours accounted for about 5 per cent. of the total calves conceived, the highest incidence of scouring and mortality being in the early spring. The onset of the condition was probably brought about by a disturbance of the delicate balance between the normal bacterial flora of the digestive tract and the resistance of the young calf. Special strains of *Bacterium coli* might then become established and increase in virulence by passage. Poor management might upset this balance, but as yet no workers had found conclusive evidence that any particular factor of management was of paramount importance in the onset of "white scours."

The importance of colostrum to the survival of the newborn calf was admitted by all, yet there were differences of opinion as to the relative importance of the various colostral constituents.

Work at Shinfield with calves reared on a semi-synthetic diet, based on dried skim milk, had shown that separated colostrum was of greater value for the protection of the newborn calf than clarified colostral fat.[2] Even as little as 80 ml. of separated colostrum protected the calves from death, though the calves scoured badly and did not grow normally.[3] Carotene, vitamins A, C, and nicotinic acid had no protective value in the absence of separated colostrum. Progressive fractionation of colostrum had shown that the "immune lactoglobulins" were the essential factor in the separated colostrum.[4]

Although American workers[10] found that soya-bean lecithin increased the absorption of vitamin A by the calf, and that calves deprived of colostrum grew normally when given lecithin and vitamin A, experiments at Shinfield did not confirm their protective value.

An experiment on the effect of *pre-partum* milking on the health of the calf[5] had shown that, on a volume basis, the *post-partum* secretion from pre-milked cows was, like milk, of less value for the well-being of the newborn calf than normal colostrum.

The possibility that the formation of abnormal curd in the abomasum was a predisposing cause to scours had been investigated. Feeding of diluted milk from birth, as had been suggested by Sheehy[15] in Ireland, had not increased the time of survival of calves deprived of colostrum.

Under conditions at Shinfield, Friesian calves appeared no more resistant than Shorthorns, although Cambridge workers[8] found the former more resistant than Ayrshires or Jerseys.

Mr. Roy then pointed out that the workers at the N.I.R.D. were, at the moment, more interested in the protective action of colostrum and possible predisposing causes of "white scours" than in "hit or miss" curative measures.

He concluded by saying that scouring in calves decreased in severity when the calves were ten days old. There were two peak scouring periods, one occurring directly the meconium had been passed, the other about eight days after birth. In the experimental calf pens at Shinfield, scouring increased in severity during the first two months that the pens were occupied.

Dr. R. ASCHAFFENBURG dealt with the protein aspects of the problem and drew attention to the globulin nature of most well-known antibodies. The protective properties demonstrated by giving a single small dose of colostral "immune lactoglobulins" to newborn calves could best be explained by assuming the presence of antibodies to *Bact. coli* in this fraction. That this was a fact and not assumption would be shown by the next speaker. During the first 24 to 36 hours of life the calf was capable of transferring ingested colostral globulins apparently intact to the blood stream. The appearance of the globulins in the serum could be demonstrated conveniently by a simple turbidity test based on the interaction of the "immune lactoglobulins" with dilute solutions of zinc sulphate.[1] Recent work by Comline, Roberts and Titchen[9] had shown that the transfer occurred via the lymphatic system. The factors causing this route to be blocked after the initial period were, as yet, unknown.

Dr. R. LOVELL dealt with the classification of *Bact. coli* by serological methods. He had attempted this in 1937[11] by using the precipitation test: it was assumed that special races of *Bact. coli* existed and that these strains acquired their virulence by killing weakly calves first. Since that time the K or capsular antigens and the O or somatic antigens of *Bact. coli* had been studied and a correlation existed between the results obtained with the precipitation test, the K antigen-antibody reaction and mouse protection tests.[6, 7] Strains of *Bact. coli* could therefore be identified by simple serological means and samples of serum and colostrum examined for K antibodies. As the protective power of colostrum was correlated with these antibodies, it was possible to study the bacteriology of "white scours" in an enclosed community as existed at Shinfield. These bacteriological studies, made with the collaboration of his colleague, Mr. P. C. Wood, yielded interesting results and figures were given in support of the conclusions drawn. A high proportion of calves deprived of colostrum died; not all calves which received colostrum, however, lived, and survival was correlated with the presence in the colostrum of K antibodies against the strains of *Bact. coli* which killed other calves which were in the same environment at the same time. Some calves died in spite of receiving colostrum, and these samples of colostrum did not contain agglutinins against the K antigens of the strains of *Bact. coli* which killed them. There was sufficient evidence to support the contention that the protective mechanism of colostrum against infection with *Bact. coli* lay in its capacity to provide the calf with a specific immunity against the prevailing bacterial flora. A change of en-

*At the meeting held at Reading on May 25th, 1951.

vironment before calving would be as hazardous for the calf as a change shortly after birth.

The changing bacteriology in an enclosed community subject to constant immigration was shown by a chart demonstrating the dominance of one serological type of *Bact. coli*. This type was replaced by another and shortly afterwards by a third and followed by a fourth type. Whether these strains tended to die or whether they remained alive for long periods in the calf pens was not known.

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General Discussion

The President thanked the essayists for a very lucid account of their experiments—and then called upon members for their questions and comments. Dr. F. W. Withers stressed the effect of climate on the incidence of scouring in calves. He said that he had found the incidence to be greatest in parts of Scotland where there was a marked variation in maximum and minimum temperatures.

Mr. R. E. Ticehurst asked how long the dam should remain in the environment in which she was to calve in order to transmit a reasonable protection to the calf in the colostrum. Dr. Lovell replied that at least three weeks would be necessary and possibly longer.

Mr. G. H. Arthur enquired about the use of serum or blood from the dam for the treatment of " white scours". Dr. Lovell replied that either would be effective if it contained the requisite coli antibodies. Dr. S. J. Edwards noted that the incidence of " white scours " was greatest in the early spring and wondered why this should be so. If " white scours " was due to *B. coli* the calf should be immune via the antibodies in the colostrum. Could it, perhaps, be due to diet or to some other organism such as Salmonella ? Dr. Lovell replied that in young calves *B. coli* was the lethal organism and many subsidiary factors clearly were involved. Salmonella might cause trouble in calves over three weeks of age. Mr. J. Weir remarked that very large numbers of calves were successfully reared without any colostrum. Mr. Roy, in reply, said that a very large number of calves which were removed from their dam nominally at birth, had, in fact, had a small quantity of colostrum before they were discovered. This small quantity would probably be sufficient to give them a reasonable mmunity. Dr. C. Briggs referred to the effect of *pre-partum* milking in diminishing the antibody content of the secretion, and to the practical importance thereof.

Professor H. Burrow asked Dr. Lovell if he believed that by passage through calves the virulence of *B. coli* would be increased and Dr. Lovell replied that the virulence of the organism could readily increase by passage.

The President then closed the discussion as the allotted time had passed.

Dr. D. L. Stewart proposed a vote of thanks to the essayists and this was carried with acclamation.

CLINICAL COMMUNICATION

HAEMOPHILIA IN A ST. BERNARD DOG

E. F. LEWIS,

Royal Veterinary College, Streatley, Berks,

and

H. H. HOLMAN,

A.R.C. Field Station, Compton, Berks

Subject.—St. Bernard dog, about 18 months old.

History.—The dog was bought at the age of ten weeks. At 14 weeks a bite on the tongue was followed by profuse haemorrhage which could not be entirely controlled even by close suturing. Later, a large haematoma occurred in the right thigh after an intramuscular injection of penicillin. Other haemorrhages followed minor cuts, contusions and the shedding of temporary teeth. These haemorrhages were so severe that the puppy became pallid, and in one instance the blood became pale in colour and watery in consistence.

Haemarthroses, characterised by the sudden development of tense, tender joints, occurred repeatedly. The joints remained painful for 24 to 48 hours and left a stiffness which disappeared very gradually. In the right stifle and hip joints, however, prolonged haemarthroses were followed by muscle atrophy which left the leg almost useless. Temperatures taken during acute haemorrhages showed rises up to 105° F.

The dog's general health remained fairly good and his appetite was unimpaired.

Breeding History.—The breeder offered no evidence which might support any hereditary transmission of the disease. The dam had a subsequent litter in which all the pups died at birth or shortly afterwards; the cause of death was unknown.

Diagnosis.—The condition was tentatively diagnosed as haemophilia.

Treatment.—Russell viper venom was successful in controlling haemorrhage when applied very closely to the injury. The topical application of thrombin did not control haemorrhage, possibly through technical difficulties in reaching the site of the haemorrhage.

Liver extracts, massive doses of vitamins, particularly C and K, and various minerals including calcium and iron, were given in an attempt to control the condition, but no effect was obtained.

Termination.—Circumstances arose which made the owner decide to have the dog destroyed. A complete blood examination was made shortly before death.

General Blood Examination.—Red count, 7·4 million per c.mm.; Packed cell volume, 41 per cent.; Hb., 18·4 g. per 100 ml.; Red cell fragility, complete haemolysis at 0·4 per cent. NaCl.; S. G., whole blood, 1·067 and plasma 1·025. Leucocyte count 8,200 per c.mm. differentiated as percentages into: Segmented neutrophiles 72, lymphocytes 12, monocytes 7, eosinophiles 9. The blood picture was therefore quite normal without evidence of either a neutrophil reaction or of anaemia.

Coagulation Factors.—Platelets 212,000 per c.mm. Clotting time (breaking capillary tubes containing blood held at 37° C.) was 39·5 minutes. Some blood run into a Dreyer's tube and ground up with sand for about 10 seconds, clotted in 3·5 minutes. Prothrombin time (Howell) was 13 minutes for tubes 4, 5 and 6, which contain the larger amounts of calcium. Bleeding time from pricked ear was well over two hours. To obtain a blood sample a hypodermic needle, 2 mm. in diameter, was thrust through the skin to the jugular vein; no excessive bleeding was noticed at this skin puncture.

Radiograph of Stifle Joints. (*See art plate in this issue*).—This showed the vague shadow of a blood clot in the right joint, together with the anterior displacement of the patella.

Discussion

There would appear to be at least three types of disease leading to excessive bleeding in dogs. Firstly, a thrombocytopenia; secondly, a tendency to excessive bleeding found in puppies—this is familial and disappears with age—and, thirdly, a haemophilia which closely resembles that occurring in man.

In America, Field, Rickard and Hutt (1946) recorded haemophilia in a family of dogs. The principal symptoms were the occurrence of haematomata and haemarthroses and they found the condition was dependent on a sex-linked recessive gene (Hutt *et al.*, 1948). These dogs, of an Irish setter stock, were handed over to the School of Medicine of the University of North Carolina, where further observations were made (Graham, Buckwalter, Hartley & Brinkhous, 1949). Affected males were kept alive until they had reached maturity by giving them repeated transfusions from normal dogs. One dog received as many as 90 transfusions before it reached the age of 22 months; each transfusion was based on a dose of 2·5 to 5 ml. of plasma, or its equivalent in blood, per kg. The dogs were injected on alternate days for as long as necessary.

The disease was very similar to that in man, in that both the platelet count and the prothrombin time were normal while the clotting time was very delayed. Field *et al.* tested the bleeding time inside the mouth and found it normal, and Dukes (1947) quotes them as recording a normal bleeding time in haemophilia. It is important to note, therefore, that Graham *et al.*, although confirming that the bleeding time in the mouth was normal, showed that the bleeding time from the ear was greatly prolonged. Graham *et al.* believe the disease to be due to the absence in the plasma of a factor liberating thromboplastin from within the platelets.

The animal that we examined would appear to fall into the category described by Graham *et al.* The platelet count and prothrombin time were normal; the somewhat quicker coagulation in the tubes containing the higher amounts of calcium chloride solution could be interpreted, not as a possible slight deficiency in calcium, but as due to the greater lysing effect on the platelets of the larger bulk of calcium chloride solution. These tests show that platelets were present, that they contained enough prothrombin, and that there was sufficient fibrinogen in the blood to form a clot.

The greatly delayed clotting time, cut short by grinding the platelet up with sand, supports the theory that without interference the platelets in this blood resist lysis, and the normal bleeding time following the puncture of the skin in the neck by a needle 2 mm. in diameter, suggests that where thromboplastin is liberated from injured tissue cells, clotting is normal. The abnormal bleeding time obtained from puncturing the ear agrees with the result obtained by Graham *et al.* and may be due, as they suggest, to the dense cartilaginous tissue present in this part.

Acknowledgment.—Our thanks are due to Dr. Phyllis Kon, who brought this case to our notice, and to Professor H. Burrow, whose interest enabled this investigation to be carried out.

(*References at foot of next column.*)

ABSTRACTS

Multiplication of Animal Viruses*

The author speculatively develops the thesis that animal viruses act within the host cell like chemical organisers, directing the cell towards producing more virus, thus departing from the usual view of viruses as degenerate organisms multiplying by binary fission. He considers that the evidence for virus particles containing enzymes is inconclusive, with the possible exception of the mucinase attributed to the influenza particle. The development within the cell of a virus colony by the viruses visible by ordinary microscopy occurs rather suddenly after a lag phase devoid of visible activity and appears as the conversion of an extensive volume of cytoplasm into virus material, so being inexplicable in terms of multiplication by fission. The volume of cytoplasm converted into virus material as a result of infection with a single virus particle is ascribed to a disruption of the particle into many soluble units which, by diffusion, involve a relatively large volume of cytoplasm. Such an explanation is consistent both with the disappearance of infective virus for a time after infection of a tissue and with the existence of a soluble, complement fixing, pre-infective phase, established phenomena for some viruses. The derivation of virus material directly from cytoplasm would explain the presence in virus of antigen characteristic of cells in which the virus has grown. Exact knowledge of the manner of multiplication of viruses is important as having a direct bearing upon methods for developing chemotherapeutic agents against them.

A. W. G.

* **Multiplication of Animal Viruses.** Bauer, D. J. (1949.) *Nature.* **164.** 767-771. (37 refs.)

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Erysipelothrix rhusiopathiae: Bacteriology and Chemotherapy*

The author reviews the extensive literature of the organism and its ecology, drawing attention to its probable saprophytic life and to normal pigs as carriers. The range of sulpha-drugs tested offers little prospect of curative action, although benzylamine-4-sulphonamide is active *in vitro*. Penicillin is highly active *in vitro*, but less so *in vivo*. Woodhouse concludes that it is an effective antibiotic for disease in man and turkeys. In swine it is less effective but may enhance the action of immune serum. Streptomycin is much less effective than penicillin, but synergic effect is obtained when both are used. Polymyxin B is inactive.

A. W. G.

* **Erysipelothrix rhusiopathiæ. Bacteriology and Chemotherapy.** Woodhouse, M. (1950.) *Bacteriological Reviews.* **14.** 161-178. (182 refs.)

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REVIEW

[Lehrbuch der allgemeinen Chirurgie für Tierärzte und Studeriende. By Professor W. Bolz, Giessen. 2nd edition. 1951. Enke: Stuttgart. D.M. 48.40.]

This is an excellent text-book on general veterinary surgery and is unusually rich in photographic illustrations. It is a revised edition of a new book which first appeared during World War II and is thus up to date.

In the field of surgery the " wound " is the central theme of the book and is described in all its aspects in general terms and in special terms as related to actual and usually illustrated examples. The horse is preponderantly featured, but cattle, pigs and dogs also are dealt with. Antisepsis is, of course, discussed and this section is reasonably up to date in that sulphonamides and penicillin receive attention; yet many old antiseptics are also referred to, although they are now definitely outmoded and obsolete.

Burns and frostbite are described in some detail, from many cases in horses observed by the author during wartime. Here the therapeutic possibilities must of necessity remain far behind those now the rule in human surgery.

As a concise yet comprehensive compendium the book is clearly successful and should be in demand by veterinary students. It is a great pity that we have nothing like it in English. It is remarkable that the quality of the material and the printing used in the book are of the highest order.

REPORT

[Australia : Commonwealth Scientific and Industrial Research Organisation. Second Annual Report, for the year ended June 30th, 1950.]

With the change over from the Council for Scientific and Industrial Research to the Commonwealth Scientific and Industrial Research Organisation in May, 1949, the arrangement of the scientific material in the annual report has also been reorganised. The work of the various Divisions and Sections is referred to briefly under the Section concerned, but the details are now set out on an animal and subject basis.

Research into problems of animal nutrition, animal health and management forms a large part of the programme of the Organisation and, as may be expected, the sheep is the main experimental animal.

Nutritional studies have covered a series of observations on the processes of rumination, vitamin A requirements and vitamin D supplements. Weekly feeding of sheep was found to have certain advantages over daily feeding in times of drought and the toxicity of large rations of wheat was shown to depend on the nutritional status of the animal fed. The rôle of copper and cobalt in the diet of the ruminant has received considerable attention and the report states that cobalt introduced into the abomasum seemed to be as effective therapeutically in cases of cobalt deficiency as cobalt introduced into the rumen, but it is not effective when introduced into the blood stream.

Investigations on the use of the insecticides DDT and BHC to prevent blowfly strike on the body of sheep have been most successful. In one trial, using a 1 per cent. DDT spray applied to sheep, 4½ inches of rain fell a few days after spraying and a severe wave of body strike occurred in the district. In the following ten days 2·4 per cent. of body strike occurred in the treated sheep compared with 12·8 per cent. in the untreated sheep running in the same paddock. During the same period 29·5 per cent. strike occurred in sheep of the same type, but not treated, running in an adjoining paddock.

In the pasture improvement work on the sheep-growing areas an aspect of importance is the control of clover dominance which may lead to infertility in sheep. Results show that adequate superphosphate dressings alone, although giving heavy clover dominance in the first, second or third years, subsequently give a rapid increase in growth of grass and result in a vigorous balanced sward. A new mineral deficiency, that of sulphur, is reported to affect soils of the table land region of N.S.W. Work with superphosphates has shown that the sulphur content of this fertiliser plays an important part in soils of very different origin within the region.

I. L. J.

NOTES AND NEWS

Diary of Events

Oct. 25th.—Meeting of the South-East Midlands Division, N.V.M.A., at Northampton (Franklin's Gardens Hotel, Weedon Road), 2.30 p.m.

Oct. 31st.—Meeting of the Lincolnshire and District Division, N.V.M.A., at Grantham (The George Hotel), 2.15 p.m.

Nov. 7th.—Dinner-Dance-Cabaret, Midland Counties Division, N.V.M.A., at Birmingham (Midland Hotel), 7.30 p.m.

N.V.M.A. Committees and Council

The following dates have been arranged for the next meetings of Committees and Council, to be held in London, the Committees at 36, Gordon Square:—

Wednesday, November 7th
2.0 p.m. Veterinary State Medicine Committee.
4.0 p.m. Parliamentary and Public Relations Committee.

Thursday, November 8th
10.0 a.m. Organising Committee.
12.0 noon. Home Appointments Committee.
2.15 p.m. General Purposes and Finance Committee.

Friday, November 9th
11.0 a.m. Council Meeting.

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Rendering of Detailed Accounts

On a number of occasions, the Association has been requested to give its views on the desirability of veterinary surgeons rendering accounts in detail to their clients. The Association considers that this should remain a private matter between veterinary surgeon and client.

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PERSONAL

Appointment.—The appointment in the Colonial Veterinary Service is announced of Mr. B. R. Thompson as Veterinary Officer, Northern Rhodesia.

Births.—Coward.—On Tuesday, October 9th, 1951, at Beech Hill Nursing Home, Barnstaple, to Elsie (*née* Dallyn), wife of T. Gordon Coward, M.R.C.V.S., a son.

Dewar.—On September 23rd, 1951, at 73, Bridport Road, Dorchester, to Joan, wife of H. D. Dewar, M.R.C.V.S., a son—Neil Douglas.

Leiper.—On October 7th, 1951, at Nottingham, to Betty (*née* Smith), wife of John Leiper, M.R.C.V.S., a second son (Quentin John).

Presentation to Mr. J. F. Garden.—In appreciation of his services, Mr. J. F. Garden, M.R.C.V.S., of Sutton Coldfield, at a function at the George Hotel, Lichfield, on September 28th was presented with an inscribed gold wristlet watch by his clients in the Sutton

Coldfield, Tamworth and Lichfield districts. Mrs. Garden was also presented with a pendant.

Mr. K. Granger said the gathering was a pleasing and at the same time sad occasion, but those present were all well-wishers who desired to show their appreciation of Mr. Garden's services.

Making the presentations, the Chairman (Mr. W. Sault) said they were all sorry to lose Mr. Garden, who had chosen to go out to the Colonial Service in Tanganyika as his father did before him. He would take with him their very hearty wishes as they had grown to love and revere him.

Returning thanks, Mr. Garden said he thanked them all very much for a really magnificent gift. He hoped it would not be very long before he would be seeing them again and he thanked them all for the very loyal support they had given him. They had become friends rather than clients.

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R.C.V.S. OBITUARY.

Goodall, Ernest Thomas, 18, Ropery Road, Gainsborough, Lincs. Graduated London, December 12th, 1898. Died May 25th, 1951. (Notification just received.)

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"EVANS" FINAL YEAR SCHOLARSHIPS, 1951-52

The Animal Health Trust announces the undermentioned awards of "Evans" Final Year Scholarships for 1951-52. These scholarships are awarded to the best student of the fourth year in each college, taking into account the results of his work during the previous years. The awards are made on the recommendations of the colleges. Those recommended for the awards to be made in the coming year are:—

Royal (Dick) Veterinary College, Edinburgh—Mr. Edward William Fisher, 2, Eversfield Road, Eastbourne.

University of Liverpool—Mr. F. R. Booth, 3, Scarsbrick Street, Ormskirk, Lancs.

University of Liverpool—Miss Elizabeth Bailey, c/o University of Liverpool, School of Veterinary Science, Field Station, Neston, Wirral.

Royal Veterinary College—Mr. J. M. Payne, Snapethorpe, Rugby Road, Lutterworth, Rugby.

Veterinary College of Ire'and, Dublin—Mr. M. A. Petris, c/o Veterinary College of Ireland, Ballsbridge, Dublin.

University of Glasgow—Mr. Frank McLinden Emmett, 15, Friarscourt Avenue, Glasgow, W.3.

These awards are made possible through the generosity of Evans Medical Supplies, Ltd., of Liverpool.

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SALE AND MOVEMENT OF SWINE IN EAST ANGLIA

Order by the Minister Declaring a Swine Fever Infected Area

The Minister of Agriculture has made an Order—the Swine Fever (Eastern Counties Infected Area) Order, 1951—which came into operation on October 17th, prescribing that in the area specified below no sale shall be held in any market, fair-ground or sale-yard unless authorised by the local authority. Only fat swine for immediate slaughter may be included in such sales. The movement of swine into, out of and within the area is also regulated.

The area affected by the Order comprises the administrative counties of Cambridge, Huntingdon, Isle of Ely, Lincoln (Parts of Holland), Norfo'k, Soke of Peterborough, East Suffolk and West Suffolk, including all the boroughs geographically situated therein, the city and county borough of Norwich, and the county boroughs of Great Yarmouth and Ipswich.

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INSURANCE AGAINST FOOT-AND-MOUTH DISEASE LOSSES

A new scheme is offered by Lloyd's Underwriters. When cattle affected by foot-and-mouth disease are slaughtered by order of the Ministry of Agriculture, this insurance policy will add to the compensation paid by the Ministry a sum equal to 25 per cent. of the compensation paid. Receipt of Ministry compensation will be accepted as entitlement to claim. There are no further formalities.

The premium is 2s. 6d. per head. Compensation is limited to £100 in respect of any one animal, and the insurance must have been in effect for 14 days for the compensation to be paid.

At the same time proposals of insurance will be accepted from "stand still" areas.

The scheme is designed to give farmers some extra money to compensate for the loss of milk supply and calves. Full particulars may be obtained from Messrs. Chandler, Hargreaves, Whittall and Company (Incorporated Insurance Brokers), Foot-and-Mouth Department, Broadway Chambers, Haywards Heath, Sussex, or from any other Lloyd's Broker.

ADDRESSES OF DISEASE-INFECTED PREMISES

List Showing the Outbreaks of Notifiable Diseases (Other than Tuberculosis) Confirmed on the Undermentioned Dates

Together With

Address of premises on which disease occurred and, in capital letters, the name of the Local Authority concerned.

Anthrax

October 8th, 1951.—Newshelves Farm, Lenham, Maidstone, Kent (Kent); Church Farm, Foulden, Thetford, Norfolk (Norfolk); Alderwood, Hatfield Road, Docklow, Leominster, Herefordshire (Herefordshire); Balhungie Farm, Monikie, Dundee, Angus (Angus); Manor Farm, Allerton, Bradford, Yorkshire (City of Bradford); Grimsthorpe Estates, Home Farm, Grimsthorpe, Bourne, Lincs (Lincoln Parts of Kesteven).

October 9th, 1951.—Two Field, Point Level, Wittersham, Tenterden, Kent (Kent); Lilac Farm, Minskip, York (Yorkshire, West Riding); Eastburn House Farm, Eastburn, Crosshills, Keighley, Yorkshire (Yorkshire, West Riding).

October 11th, 1951.—Slaughterhouse at Butcher shop known as "The Dorkings," Great Broughton, Middlesbrough, Yorkshire (Yorkshire, North Riding).

Fowl Pest

October 5th, 1951.—Glanfield Poultry Farm, Dale Avenue, Longton, Preston, Lancashire (Lancashire).

October 9th, 1951.—The Bungalow, Hall Lane, Longton, Preston, Lancs; Ho'ding in Dale Avenue, Longton, Preston, Lancs (Lancashire).

October 11th, 1951.—Bernard Dene, Hall Lane, Longton, Preston, Lancs (Lancashire); Clifton Poultry Farm, Longton, Preston, Lancs (Lancashire); The National Egg Laying Test Ltd., Milford, Godalming, Surrey (Surrey); Poultry Production and Progeny Trials, Field Foot Farm, Goosnargh, Preston (Lancashire).

Swine Fever

October 6th, 1951.—Gills Lane, Outwell, Wisbech, Cambs (Norfolk); The Piggeries, South Lane, Bold, Widnes, Lancs (Lancashire); The Bungalow, Long Lane, Hindley Green, Wigan, Lancs (Lancashire).

October 8th, 1951.—Unit Farm, Oakington, Cambridge (Cambridgeshire); 118, Stockport Road, Bredbury, Woodley, Stockport, Cheshire (Cheshire); The Poplars, Drain Bank, Cowbit, Spalding, Lincolnshire (Lincoln Parts of Holland); The Cedars, Church End, Gedney, Spalding, Lincolnshire (Lincoln Parts of Holland); Manor Farm, Scarning, Dereham, Norfolk (Norfolk); Burgess Field, Albermarle Road, Newcastle, Staffs (Newcastle-under-Lyme); Brook Farm, Holbrook, Ipswich, Suffolk (Suffolk, East); 23, Queens Road, Bury St. Edmunds, Suffolk (Suffolk, West); Townhead Farm, Brunthwaite, Silsden, Keighley, Yorkshire (Yorkshire, West Riding); Uplands Farm, Carlton Colville, Lowestoft, Suffolk (Suffolk, East); Anchor Cottages, Anchors Yard, East Gate, Worksop, Nottinghamshire (Nottinghamshire); The Chestnuts, The Hollow, Ramsey, Hunts (Huntingdonshire); Premises of Mrs. Carswells, Thorn Cottage, Fengate, Peterborough, Northants (City of Peterborough); Inglenook, Kendal End Road, Barnt Green, Birmingham (Worcestershire); Levenside Allotments, Stokesley, Middlesbrough (Yorkshire, North Riding).

October 9th, 1951.—59, The Ridgeway, Flitwick, Bedford (Bedfordshire); Bromborough Estates Ltd., Manor Farm, Podington, Wellingborough, Northants (Bedfordshire); Manor Farm, Highfield Farm, and Mill Houses Farm, Litlington, Royston, Herts (Cambridgeshire); The Mill House, Halvergate, Norwich, Norfolk (Norfolk); Bridge Hill Road, Newborough, Peterborough, Northants (Soke of Peterborough); 29, Lower Olland Street, Bungay, Suffolk (Suffolk, East); Brinsworth Street Allotments, Rotherham, Yorks (Borough of Rotherham).

October 10th, 1951.—Beggars Barn, Mickleton, Campden, Glos (Gloucestershire); The Brickyard, Fortyfoot Bridge, Ramsey, Hunts (Huntingdonshire); Low Farm, Waresley, Sandy, Beds (Huntingdonshire); Bayford Farm, Upchurch, Sittingbourne, Kent (Kent); 11, Sluice Road, Holbeach, Lincs (Lincoln Parts of Holland); Lancefield Farm, Thorpe Malsor, Kettering, Northants (Northamptonshire); Clock Close Allotments, Wellingborough Road, Earls Barton, Northampton (Northamptonshire); Sunnyside Farm, Vigo, Walsall Wood, Walsall, Staffs (Staffordshire); Valley Farm, Milden, Suffolk (Suffolk, West); Herts Training School, Chapmore End, Nr. Hertford, Herts (Hertfordshire).

October 11th, 1951.—Avenue Farm, Uppington, Wellington, Salop (Carcase at: Ministry of Food Slaughterhouse, Shrewsbury, Shropshire) (Salop); Poplar Farm, Ridgewell, Halstead, Essex (Essex); Grammar School Field, High Street and Park Lane, Holbeach, Lincs (Lincoln Parts of Holland); St. Joseph's Convent, Haunton, Tamworth, Staffs (Staffordshire); Intake Farm, Oakworth, Keighley,

Yorkshire (Yorkshire, West Riding); Summerfield Farm, Eastry, Nr. Sandwich, Kent (Kent); Mill Farm, Claypole, Newark, Notts (Lincoln Parts of Kesteven); Ankerton House Farm, Eccleshall, Stafford (Staffordshire); The Cottage, Barton Mills, Bury St. Edmunds, Suffolk (Suffolk, West); New Delight Inn, Colden, Hebden Bridge, Yorks (Yorkshire, West Riding).

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RESEARCH

(1)* Research is to medicine what operational research was to military planning in the last war, or to use another comparison, what modernisation of plant and machinery is to present-day industry. One can hardly conceive of too much being done.

What are the main obstructions?

First there is the attitude that research is, in essence, but a frill or luxury, and not really vital to the structure of medicine. It is something, therefore, which tends to be cut first in the now chronic economy atmosphere.

The other obstruction is that research workers remain by tradition the financial Cinderellas of medicine. Yet research talent is rare and ought to be encouraged as something precious, and should command special rewards. Yet in practice great improvements would be made were it even rewarded on an equal basis with clinical medicine, not only in relation to what is offered to younger men but in terms of future prospects and security. At present the attractions of the registrar-consultant ladder so outweigh what a research career seems to offer, that research talent is being strangled at birth by economic sanctions. And then people turn round and say "We'd like to get some research going but one cannot find any good men." It is all very short-sighted for in research, more than in any other sphere, the man is the key to success:

> "The real discoverer is rare in all classes and it must be the object of civilised communities to find him and foster his activities. Though generally the more able the investigator the less his demands on life's amenities, the scientific genius when found must not be expected to use all his time and energy fending for a living." (Mellanby.)
>
> "In view of the rarity with which the abilities requisite for a fine research worker are joined in any man, the search for such persons should be deliberate yet eager, the training facilities catholic and discriminating, and our support loyal and reverent before the opportunity to be shown new truth." (Gregg.)

[* Section of Radiology. Royal Society of Medicine. President's address (Our Research Responsibilities. Ralston Paterson, M.C., C.B.E., M.D., F.R.C.S., F.F.R., D.M.R.E.). (May 18th, 1951.) *Proc. Roy. Soc. Med.* **44**, 894.]

(2)† "One of the features of university life we most cherish is the pursuit of knowledge for its own sake."

Speaking of the functions of Government research councils, Lord Rothschild said the great advances in science, whether of a fundamental or of an applied nature, came, at any rate in peace-time, from the labours of good workers rather than from the minds of central co-ordinators assessing the needs of the nation. Benefits would accrue if the nation saw to it that scientists were able to work under good conditions of pay, environment, and equipment. In this sense the research councils were the servants and not the masters of the scientists they subsidised, and it was a good thing to remind the research councils of this from time to time.

[† Lord Rothschild, Chairman of the Agricultural Research Council, at the opening of the new building of the Department of Botany, University of Oxford, October 8th, 1951. (*The Times*, October 9th, 1951.)]

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NEW ZEALAND VETERINARY SCHOLARSHIPS

The New Zealand Veterinary Services Council announces that, largely as a result of the benefits which accrued from a visit to the United Kingdom of a New Zealand veterinary surgeon as a British Council bursar last year, it has inaugurated its own overseas scholarships.

They are open to veterinary graduates with five years in approved practice in New Zealand, are for not more than eight months and cover fares and salary, plus £40 a month

The first two scholarships have been awarded to Mr. H. C. McDiarmid and Mr. G. L. Yockney, who will come to the United Kingdom early next year.

The British Council bursar was Mr. C. W. L. Purdie, of the Waimea Veterinary Service. His programme was arranged in conjunction with the Royal College of Veterinary Surgeons and the Ministry of Agriculture, and he spent periods with a number of veterinary surgeons, witnessing the conduct of their practices and the techniques they had developed.

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the N.V.M.A.

TUBERCULIN TESTING

Sir,—I have read with some interest the two letters from Mr. G. C. Lancaster in recent issues of the *Record*.

I entirely agree with him that the first tuberculin test of a herd is inclined to give very unreliable results, but I would plead for a complete converse to his suggestion, that is to say, that no animal be given a certificate to the effect that it has passed a test until it has passed at least twice!! In this way we might give very much greater protection to our clients who are endeavouring to eradicate tuberculosis.

I fail entirely to see the connection between the interpretation of the tuberculin test and the fact that many farmers are swinging over to beef cattle. Like Mr. Lancaster, I deplore this change, as I agree with him that it is inevitable that it will produce a shortage of our only cheap and plentiful protein food, *i.e.*, milk, but feel that this is a direct result of the price offered for the product.—Yours faithfully, L. Guy Anderson, 49, Cambridge Street, Aylesbury, Bucks. *October 13th*, 1951.

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EVOLUTION OF CAT CASTRATION

Sir,—To my personal knowledge about 70 years ago cats were castrated by the butcher and the practice still persists in some districts.

Fifty-six years ago I castrated kittens under an anaesthetic by placing them under an ordinary upturned galvanised bucket and inserting cotton wool soaked with A.C.E. mixture inside the bucket: it was a simple but not very convenient method. A few years later I had a wooden box, 21 inches by 12 inches by 9 inches, constructed with handles at each end for ease in handling, a hinged lid, a glass front and at one corner a copper tube with a stopcock and a funnel top, extending to the bottom of the box. The kitten was placed in the box and the lid held closed by two buttons. A.C.E. mixture being poured in through the tube. The kitten was kept under observation through the glass front and when it was under the anaesthetic it was taken out and castrated. The procedure was carried out single handed and the kitten could be returned to the owner half an hour after being brought to the surgery.

I found the method very useful when owners wished the castration to be performed at their home, also for destroying cats with choloroform.—Yours faithfully, A. Hart, The Anchorage, Ardnadam, Dunoon, Argyll. *October 10th*, 1951.

DISEASES OF ANIMALS ACT, 1950—GREAT BRITAIN

Summary of Returns of Confirmed Outbreaks of Scheduled (Notifiable) Diseases

Period	Anthrax	Foot-and-mouth	Fowl Pest	Parasitic Mange*	Sheep Scab	Swine Fever
Sept. 16th to 30th, 1951	8	—	2	—	1	81
Corresponding period in—						
1950	12	—	—	—	1	48
1949	16	—	42	—	—	—
1948	9	1	2	—	9	—
Jan. 1st to Sept. 30th, 1951	319	28	601	—	5	913
Corresponding period in—						
1950	277	20	102	—	21	176
1949	166	13	408	—	33	5
1948	79	2	249	1	48	23

* Excluding outbreaks in Army Horses.

Tuberculosis (Attested Herds) Schemes

The number of Attested Herds, *i.e.*, herds officially certified as free from Tuberculosis as at September 30th, 1951, was as follows:—

England	Wales	Scotland	Total (Great Britain)
33,461	19,289	15,881	68,631